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# Engineering Experiment Station Bulletin

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University of Kentucky  
College of Engineering

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## PROCEEDINGS OF THE KENTUCKY HIGHWAY CONFERENCE



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ENGINEERING EXPERIMENT STATION BULLETIN SERIES

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JUNE 1950

NO. 4

**UNIVERSITY OF KENTUCKY  
ENGINEERING RESEARCH**

**PROCEEDINGS  
of the  
KENTUCKY HIGHWAY CONFERENCE**

held at the University of Kentucky  
MARCH 2-3, 1950  
sponsored by  
College of Engineering  
University of Kentucky and  
Kentucky Department of Highways

Edited by  
E. EVERETT ELSEY  
Associate Professor of Engineering Research

**BULLETIN NO. 16  
JUNE 1950**



**The Engineering Experiment Station  
College of Engineering  
University of Kentucky  
Lexington**



**UNIVERSITY OF KENTUCKY  
ENGINEERING EXPERIMENT STATION**

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**E. Everett Elsey**

Editor of the Engineering Experiment Station Bulletins

# ENGINEERING EXPERIMENT STATION

UNIVERSITY OF KENTUCKY

COLLEGE OF ENGINEERING

PUBLICATIONS

<i>Vol.</i>	<i>No.</i>	<i>Bul. No.</i>	<i>Titles</i>
1	1	1	Facilities for Performing Engineering Research
1	2	2	An Improved Method for Computing Pressures, Temperatures, and Power Output of Internal-Combustion Engines Operating on the Otto-Cycle.— Willis Merle Carter, Professor of Machine Design.
1	3	3	Mineral Engineering Research — H. Comer Wolf, Consultant in Mineral Engineering.
1	4	4	Development of the Heat Pump — Estel B. Penrol, Professor and Head, Department of Mechanical Engineering.
2	1	5	Air Entrainment in Cement Concrete — L. E. Gregg.
2	2	6	Measurements, Analysis, and Statistical Nature of Deionization Time in a Mercury Vapor Thyatron.— H. Alex Romanowitz, Professor of Electrical Engineering.
2	3	7	The Silicosis Hazard in the Monument Industry of Kentucky.— Charles Mason Davidson.
2	4	8	Development of a Practical Method of Burning Alcohol in a Gasoline Tractor.
			and
			The Calculation and Charting of the Thermodynamic Properties of an Ethyl Alcol-Air Mixture and its Combustion Products.— Andre J. Meyer, Director Aeronautical Research Laboratory, and Ralph E. Davis, Research Fellow.
3	1	9	A Preliminary Report on the Iron Ore Resources of Kentucky.— C. S. Crouse, Head, Department of Mining and Metallurgical Engineering. James L. Wyatt, Graduate Assistant, Department Metallurgical Engineering.
3	2	10	An Investigation of the Weir Sand Producing Reservoir for Secondary Recovery Possibilities.— W. E. Lang, Production Engineer.
3	3	11	Panel Cooling Design Including Lighting Load.— Merl Baker, Assistant Professor of Mechanical Engineering.
3	4	12	Proceedings of the Kentucky Highway Conference <i>March 3-4, 1949.</i>
4	1	13	Investigation of Field and Laboratory Methods for Evaluating Subgrade Support in the Design of Highway Flexible Pavements.— R. F. Baker, Research Engineer and W. B. Drake, Research Engineer.
4	2	14	Earth Heat Pump Research.— Estel B. Penrod, Head, Department of Mechanical Engineering.
4	3	15	The Determination of Constant Altitude Range Performance of Turbojet-Propelled Aircraft.— Wm. F. Savage, Asst. Professor, Dept. of Mechanical Engineering.

The Engineering Experiment Station of the College of Engineering was established on July 1, 1946, by an act of the Board of Trustees of the University of Kentucky. Its objectives are:

- (1) To organize, initiate and promote engineering research of special interest to the State.
- (2) To aid and consult with industry regarding its research problems.
- (3) To promote the conservation and utilization of the State's resources.
- (4) To provide support for research training in the fundamental and applied sciences.

The management of the Engineering Experiment Station is vested in a Director and an Executive Committee which controls its policies and operation. They are as follows:

Director: Dean of the College of Engineering

Head of the Department of Civil Engineering

Head of the Department of Electrical Engineering

Head of the Department of Mechanical Engineering

Head of the Department of Mining and Metallurgical Engineering

Director of Aeronautical Research Laboratory

To make available to the interested public the results of its Industrial Research and investigations, the Engineering Experiment Station publishes and distributes a series of bulletins each year.

For copies of publications or for other information address:

**Engineering Experiment Station**

**University of Kentucky**

**College of Engineering**

**Lexington 29, Kentucky**



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### ACKNOWLEDGEMENT

Appreciation of the efforts of all those who made the Kentucky Highway Conference a success is gratefully expressed. Additional thanks are due the authors of the following papers. These extra contributions of their time, knowledge, and experience were most beneficial.

## FOREWORD

Feeling the need for a further exchange of ideas on better roads, the College of Engineering, University of Kentucky and the Kentucky Department of Highways again cooperated in sponsoring a two-day conference early last March.

The results of this conference as evidenced by the attention, attitude, and comments of those who attended were quite gratifying. The talks delivered are set forth in this bulletin as a record for the visitors at the conference and as information for others.

It is hoped that these meetings will be a means of closer cooperation and understanding not only among members of the Highway Department but with all State, County, and City officials whose work is connected in any way with the motor transportation system of the State.



## KENTUCKY HIGHWAY CONFERENCE

### PROGRAM

University of Kentucky  
Lexington, Kentucky

THURSDAY, MARCH 2

#### MORNING

8:30 – 10:00

Registration – Memorial Hall

10:00 – 11:30

Session 1 – Memorial Hall

Presiding – D. V. Terrell, Dean, College of Engineering University of  
Kentucky

Welcoming Address – Leo M. Chamberlain, Vice President, University  
of Kentucky

Kentucky's Rural Highway Program – Hon. Emerson Beauchamp,  
Commissioner of Rural Highways, Kentucky Department of High-  
ways

Announcements

#### AFTERNOON

12:00 – 1:15

Luncheon – Student Union Building (Purchase Tickets Not Later  
than 10:00 a.m.)

Introduction — E. Everett Elsey, Associate Professor Engineering Research, University of Kentucky

Address — Some Aspects of Atomic Energy — Dr. W. S. Webb, Head of Department of Physics, University of Kentucky

1:30 — 4:30

Session 2 — Memorial Hall

County Road Programs

Presiding — Judge S. R. Cheek, County Judge, Boyle County, Kentucky

1. "Experience in Activating a Master County Road System"— E. C. Rogers, County Engineer, Madison County, Tennessee, Jackson, Tennessee
2. "The Importance of Adequate Right of Way for Rural Road Improvement"— R. D. Thompson, County Road Engineer, Lincoln County, Kentucky
3. "Balancing Expenditure for Grading, Draining and Surfacing"— L. C. Pendley, Asst. Prof. of Civil Engineering, University of Kentucky
4. "Each County Needs a Qualified County Road Engineer"— Judge Brady Stewart, County Judge, McCracken County, Paducah, Kentucky

Discussion

NIGHT

6:30

Dinner — Student Union Building — Ball Room (Purchase Tickets Not Later than 1:30 p.m.)

Toastmaster — J. Frank Grimes, President, Kentucky Section of American Society of Civil Engineers

Address — Robert B. Brooks, Consulting Engineer, St. Louis, Mo.

FRIDAY

9:00

Session 3a.— Room 205, Anderson Hall

County and City Officials

Presiding — W. O. Snyder, Executive Secretary Kentucky Association of Highway Contractors

1. State, County, and Municipal Roads in a Balanced Highway System — W. P. Curlin, Deputy Commissioner of Highways

2. Municipal Problems — N. W. Neel, City Engineer, Henderson, Kentucky

Discussion



Session 3b.— Memorial Hall

Construction — Maintenance — Design

Presiding — D. H. Bray, State Highway Engineer

1. Responsibility of the Engineer in the Field — Hon. John A. Keck, Commissioner of Highways
2. Interpretation of Plans and Specifications, Panel Discussion — L. E. Gregg, Associate Director of Highway Materials Research Laboratory — Moderator\*

C. B. Owens — Division of Construction

W. S. Todd — Division of Construction

C. L. Logan — Bureau of Public Roads

A. O. Niser — Division of Design

J. A. Bitterman — Division of Tests

M. F. Johnson — Division of Maintenance

Session 3c.— Room 204, Anderson Hall

Structural Discussions

Presiding — S. A. Mory, Jr., Professor of Structural Engineering, University of Kentucky

1. Low Cost Bridges for Secondary Roads — G. Wood Smith, Vice President, Sverdrup & Parcel, Consulting Engineers, St. Louis, Missouri
2. Toll Facilities in the Highway Program — Craig P. Hazelet of Hazelet and Erdal, Consulting Engineers, Louisville, Kentucky
3. Economics in Erection of Long-Span Continuous Steel Bridges — Harry A. Balke, Consulting Engineer, Cincinnati, Ohio

Discussion

AFTERNOON

12:15 - 1:30

Luncheon - Student Union Building Ball Room (Purchase Tickets Not Later Than 4:00 p.m. Thursday)

Presiding - D. V. Terrell, Dean, College of Engineering, University of Kentucky

University Picture - "The University of Kentucky - A Place, A Spirit"

1:45 - 4:30

Session 4 - Memorial Hall

Presiding - R. E. Shaver, Head, Department of Civil Engineering, University of Kentucky

1. Road Side Improvement - N. R. Elliott, Professor of Landscape Architecture, University of Kentucky
2. Effect of Surface Irregularities on the Riding Qualities of High Type Pavements - Harvey J. Field, Jr., Assistant Research Engineer, Highway Materials Research Laboratory, University of Kentucky
3. Traffic Control - W. P. Ringo, Director of Traffic, Kentucky Department of Highways
4. Problems of the District Engineer - Technical and Otherwise - B. T. Moynahan, District Engineer, Sixth District, Kentucky Department of Highways

Discussion